the author has been very largely successful in his endeavour to adapt the subject to the comprehension of those to whom the book would be most useful. It is not even yet easy reading—it is doubtful if any thorough text-book of physical chemistry *can* be easy reading—but no intelligent advanced student of chemistry can neglect to peruse and ponder it if he wishes to be abreast of the latest developments of the theoretical side of his science in their actual and in their potential aspects. We learn with pleasure that an English translation of this important work is in course of preparation.

THE CHEMISTRY OF DRUGS.

(1) *Grundriss der Pharmakochemie.* By Dr. O. A. Oesterle. Pp. xii+562. (Berlin: Gebr. Borntraeger, 1909.) Price 17.50 marks.

(2) *Southall's Organic Materia Medica. A Handbook treating of the more important of the Animal and Vegetable Drugs made use of in Medicine, including the whole of those contained in the British Pharmacopoeia.* By J. Barclay. Seventh edition. Revised and enlarged by E. W. Mann. Pp. xx+376. (London: J. and A. Churchill, 1909.) Price 7*s.* 6*d.* net.

(1) DURING the past quarter of a century a steadily increasing amount of attention has been devoted to the study of crude drugs. The investigations of these have proceeded largely upon botanical lines, many researches having been published on the morphology and anatomy of vegetable drugs and the microscopical characters of their powders. The authors of modern text-books of pharmacognosy have, in most instances, confined themselves almost entirely to dealing with their subject from this point of view, and have been very niggardly in the treatment of the history, commerce, and chemistry of drugs. Great strides have, however, been made in the chemical investigation of the constituents of vegetable as well as animal drugs. The constitution of many has been satisfactorily elucidated, and not a few have been synthetically prepared. The literature of these investigations is, unfortunately, scattered in various journals and special publications, and every teacher of pharmacognosy will have experienced the difficulty of, as well as the necessity for, collecting such information, notwithstanding the useful works of Brühl, Pictet, van Rijn, Schmidt, Dekker, and others.

Prof. Oesterle's work appears, therefore, most opportunely. He deals with those crude organised vegetable drugs the constitution of the constituents of which has been more or less completely ascertained, but has excluded the resins and oleo-resins, as these have recently been exhaustively treated by his colleague, Prof. Tschirch. The individual drugs are grouped according to their characteristic constituents, a rational arrangement, since allied constituents commonly have similar therapeutic action, and it is for this that drugs are employed. The important constituents alone are considered, but they are considered very fully. The manner in which their constitution may be demonstrated, the successive stages in their decomposition, and the synthesis of the substance itself or of a characteristic decomposition-product are fully explained, though perhaps here and there speculation is somewhat in evidence. To the section of alkaloidal drugs 159 pages are devoted, to aromatic drugs 247, to glucosidal 46, to colouring matters 64, and to tannoids 12. Hence the second section has the lion's share, which, perhaps, is scarcely in accordance with its importance from the therapeutical point of view. To the constituents of opium 33 pages are devoted, to those of cinchona bark 19, while the consideration of menthone alone occupies 7.

Hydrastine may be selected as an example of the manner in which the constituents are treated. First the steps are shown by which hydrastine, by exhaustive methylation, is converted into hydrastonic and hemipinic acids, the constitutional formulæ, occupying three pages, being given; next the production of hydrastinine and opianic acid from hydrastine, and the conversion of hydrastinine into oxyhydrastinine and hydrastininic acid are shown together with the production from the latter of hydrastic acid and methylamine; then the action of caustic alkali upon hydrastinine resulting in the formation of hydrohydrastinine and oxyhydrastinine is explained, and finally the synthesis of hydrohydrastinine from piperonal and acetalamine.

A slight feeling of regret may be expressed that the author has confined himself to vegetable drugs, as those of animal origin contain several important constituents which have been isolated and examined.

Prof. Oesterle's work will be heartily welcomed by all who are interested in the constituents of drugs. It forms a unique contribution to scientific pharmacognosy, and will undoubtedly stimulate others to labour in a similar field.

(2) The fact that this work has now reached its seventh edition is sufficient testimony of the estimation in which it has been held, and the new issue, revised by Mr. Mann, who is well known for his contributions to the chemistry of drugs, will doubtless enjoy a similar popularity.

The general arrangement of the subject-matter remains the same, but increased attention has rightly been given to the chemical constituents of drugs, which have been dealt with, on the whole, in a very satisfactory manner, although here and there, as, for instance, the cyanogenetic glucosides of cherry-laurel leaves, wild cherry bark, &c., they have not been brought quite up to date. So far as the utility of the work from the point of view of the student is concerned, there are certainly two or three weak points. In the first place, the restriction of the description of official drugs to the characters given in the British Pharmacopœia has involved the omission of much that is important as well as interesting. Official descriptions of drugs are necessarily brief, and much that the student should observe and know concerning them is omitted. Details of the production, collection, preparation for the market, commerce, history, &c., are but meagre. Considerable help might have been

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afforded by a few judiciously selected illustrations, but these the author considers undesirable.

The large number of drugs dealt with renders the book extremely valuable for reference, but the defects alluded to militate against its efficiency as an educational work for students. HENRY G. GREENISH.

MAGNETO- AND ELECTRIC-OPTICS.

(1) *Magneto- und Elektro-optik.* By Dr. Woldemar Voigt. Pp. xiv+396. (Leipzig: B. G. Teubner, 1908.) Price 14 marks.

(2) *Cours de Physique.* Cinquième Partie. Électroptique. Ondes Hertziennes. By Prof. H. Bouasse. Pp. 426. (Paris: Delagrave, n.d.) Price 14 francs.

(1) THIS is a work on one of the most fascinating branches of modern science by one of those who have done most towards its development. To all students of physics the volume is to be specially recommended as giving an admirable account of a subject which has the most intimate bearing on present theories of the constitution of matter; to those who are themselves working in the same field the name of the author will be sufficient to indicate that the book is indispensable.

The subject dealt with is not the electromagnetic theory of light in general, but, in Prof. Voigt's own words, "that special branch of optics which deals with the action of a magnetic or an electric field on the optical properties of bodies." The study of this special branch of optics may be said to have begun in 1845 with Faraday's experimental demonstration that the plane of polarisation of a beam of polarised light is rotated by the action of a magnetic field having its lines of force parallel to the direction in which the light is travelling. Since that date an enormous amount of attention has been given to the phenomena due to the action on light of a magnetic or an electric field. In 1876 Kerr succeeded in detecting the rotation of the plane of polarisation when light is reflected normally from the surface of a ferromagnetic metal in a strong magnetic field. In 1896 Zeemann showed that the periods of free vibration of the light emitted by a flowing gas are changed by the direct action of a magnetic field, and that there is a corresponding action on an absorbing medium. In 1898 Voigt himself showed that a body in a magnetic field becomes doubly refractive in the direction perpendicular to the lines of force, in the same manner as a uniaxial crystal perpendicular to its axis. In the section of electro-optics, the advances made are less marked. Kerr's demonstration that an isotropic insulating substance becomes doubly refractive in the direction perpendicular to the lines of electric force may be taken as fundamental. An army of workers has followed along the main lines thus indicated, and to-day the mere marshalling of the known facts of observation is a task of no small difficulty, while there are many points of which theory yet fails to give any convincing explanation.

Prof. Voigt's book is founded on lectures given by him at Göttingen University. The material thus available, however, has clearly been greatly extended and amplified, with results which may be regarded as exceptionally satisfactory. Thus the elementary and fundamental facts of observation, as well as all the more important experimental appliances and apparatus, are very fully and clearly described, while, on the other hand, a large amount of detail as to the latest developments, both in experiment and theory, is included. In a branch of knowledge so necessarily subject to modification under the influence of new ideas, it is usually to be expected that a volume will be already almost antiquated by the date of its publication, but one of the chief claims of the present work to attention is the extent of the information given as to the most recent work.

The first two chapters are devoted to setting forth the fundamental observations and the principal experimental methods and developments in connection with the Faraday effect and the Zeeman effect. The two chapters following, covering some 120 pages, are concerned with the explanation of these observations on the electron theory. The chief feature of Voigt's own work is the establishment of a simple connection between the emission and absorption phenomena and the rotatory effect of the magnetic field, and the development of the theory here given is founded on the series of papers published by the author between 1898 and 1902 in the *Annalen der Physik.* The theory is, however, here further extended, and includes, in chapter v., a discussion of Becquerel's more recent experiments on crystals of compounds of the rare earths.

The remaining chapters are devoted to the discussion of the "magnetic" Kerr effect, and the consideration of the fundamental phenomena of electro-optics. In the field of electro-optics the experimental difficulties have rendered progress slow. Insulation breaks down under very high voltages, and conduction is never entirely absent, and more refined methods of observation are necessary before the indications of theory can be verified. The subject is, however, of great theoretical interest and importance, and the publication of the present work will no doubt do much in stimulating further research.

(2) The general plan of the "Cours de Physique," of which the present volume is the fifth part, is somewhat unusual. The volumes previously issued bear the titles:—(1) "Mécanique Physique"; (2) "Thermodynamique—Théorie des Ions"; (3) "Électricité et Magnétisme"; (4) "Optique. Étude des Instruments," the part here considered being devoted to the general discussion of electromagnetic radiations, including Hertzian waves. Part vi. is to be entitled "Étude des Symétries"; from the references in the present volume we gather that this might best be translated "Crystallography." We are by no means clear that the arrangement thus outlined is satisfactory. In the volume before us especially, the inclusion of the discussion of Hertzian waves, though entirely logical and perfectly defensible on theoretical grounds, seems to us unfortunate. The questions involved are essentially practical and of special interest to the electrician, and the early chapters devoted to

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